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| APPLICATION NO.               | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-------------------------------|-------------|----------------------|---------------------|------------------|
| 10/588,127                    | 07/31/2007  | Yoav Schechner       | P-9034-US           | 3737             |
| 49443                         | 7590        | 06/25/2008           |                     |                  |
| Pearl Cohen Zedek Latzer, LLP |             |                      | EXAMINER            |                  |
| 1500 Broadway                 |             |                      | AN, SHAWN S         |                  |
| 12th Floor                    |             |                      |                     |                  |
| New York, NY 10036            |             |                      | ART UNIT            | PAPER NUMBER     |
|                               |             |                      | 2621                |                  |
|                               |             |                      | MAIL DATE           | DELIVERY MODE    |
|                               |             |                      | 06/25/2008          | PAPER            |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |   |  |
|------------------------------|--------------------------------------|---|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/588,127 | <b>Applicant(s)</b><br>SCHECHNER ET AL. |  |
|                              | <b>Examiner</b><br>SHAWN AN          | <b>Art Unit</b><br>2621                 |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-7 and 11-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Westhaver (5,719,715) in view of Lai et al (6,470,097 B1).

**Regarding claims 1, 14, and 17,** Westhaver (5,719,715) discloses a system/method for enhancing underwater imaging affected by image degradation effects, the system comprising:

an imaging device (Fig. 13, 40, camera) adapted to acquire at least one image of an underwater scene using an imaging device;

a processing unit (30) for determining information regarding distances (P2) of parts of the scene relative to the imaging device and for reconstructing an image of the underwater scene by compensating image characteristics influenced by distance-dependent underwater degradation effects including veiling light, and using the information on the distances of parts of the scene from the imaging device, and compensating distance-dependent underwater degradation effects relating to the distance of illumination sources from the scene (col. 6, lines 15-35).

Westhaver does not particularly disclose reconstructing an image using a physics-based mathematical model.

However, Lai et al (6,470,097 B1) teaches total variational image restoration from image sequences comprising restoring an image (Fig. 1) using a physics-based

mathematical model in order to solve an image-blur coupled optimization problem (col. 6, lines 1-67, see motion model; col. 2, lines 35-43).

Therefore, it would have been obvious to a person of ordinary skill in the relevant art employing a system/method for enhancing underwater imaging affected by image degradation effects as taught by Westhaver to incorporate the well known concept as above as taught by Lai et al so as to reconstruct Westhaver's image using Lai's physics-based mathematical model in order to solve an image-blur (associated with being underwater) coupled optimization problem.

**Regarding claim 2**, Westhaver discloses one of the image characteristics comprising color (col. 6, lines 15-35).

**Regarding claim 3**, Westhaver discloses compensating effects attributing to the underwater depth of the scene (Fig. 13, P1).

**Regarding claim 4**, Westhaver discloses compensating effects attributed to the underwater depth of the scene comprises color-balancing (col. 6, lines 15-35). Furthermore, white-balancing is a conventional processing technique known for improving image quality and making the image more pleasing to the viewer.

Therefore, it would have been considered obvious to perform white-balancing, thereby improving image quality and making the image more pleasing to the viewer.

**Regarding claims 5-6**, Lai et al teaches an inverse filtering and regularization (abs.; col. 1, lines 19-21). Furthermore, Applicant's background of the invention discloses improvement of underwater visibility by reduction of a backscatter with a polarization technique.

Therefore, it would have been considered obvious for Lai's physics-based mathematical model to comprise an inversion of an image-formation model including backscatter, thereby improving underwater visibility.

**Regarding claim 7**, it is considered an obvious design choice for Lai's image-formation model (that is inverted) to be approximated such that the approximation error is not discernible just as long as the end result is desirable.

**Regarding claims 11-12 and 15**, it is conventionally well known to utilize two video cameras for acquiring at least two images simultaneously to display 3-D (stereoscopic) images.

Therefore, it would have been considered an obvious design choice to utilize at least two video cameras so that the reconstructed image comprises 3-D rendering of the scene.

**Regarding claim 13**, Westhaver discloses the information regarding distances of parts of the scene relative to the imaging device being used to reconstruct a distance map of the scene (Fig. 13, see P2).

**Regarding claim 16**, Westhaver discloses determining of information regarding distances of parts of the scene relative to the imaging device comprises extracting the information (color balance) from the at least one image (col. 6, lines 15-35).

**3.** Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Westhaver and Lai et al as applied to claim 1 above, and further in view of Auty et al (5,809,161).

**Regarding claims 8-9**, Westhaver does not particularly disclose acquiring at least two images in different imaging settings and different resolution.

However, Auty et al teaches an object monitoring system comprising at least two cameras (Fig. 1, 6 and 8) for acquiring at least two images in different imaging settings and different resolution(s) for determining an acquisition time when an image of the object is to be acquired and acquiring the image at the predetermined time (abs.; col. 4, lines 44-66).

Therefore, it would have been obvious to a person of ordinary skill in the relevant art employing a system/method for enhancing underwater imaging affected by image degradation effects as taught by Westhaver to incorporate the well known concept as above as taught by Auty et al so as to acquire at least two images in different imaging settings and different resolution(s) for determining an acquisition time when an image of the object is to be acquired and acquiring the image at the predetermined time as desired.

**Regarding claim 10**, it is conventionally well known to acquire at least two images of the scene in different polarizing states of the imaging device to be applied in many applications such as polarized eye glasses, 3D stereoscopic displays, and other optical systems.

Therefore, it would have been considered quite obvious to acquire at least two images of the scene in different polarizing states of the imaging device to be applied in many applications such as polarized eye glasses, 3D stereoscopic displays, and other optical systems.

### ***Conclusion***

**4.** The prior art made of record is considered pertinent to Applicant's disclosure.

A. Nonaka (5,826,113), Auto-focusing camera capable of photographing in water.

**5.** Any inquiry concerning this communication or earlier communications from the Examiner should be directed to *Shawn An* whose telephone number is 571-272-7324.

**6.** Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Art Unit: 2621

7. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/SHAWN AN/

Primary Examiner, Art Unit 2621

6/17/08

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